

WHAT IS CLAIMED IS

1. An internal combustion engine diagnosis apparatus comprising a cleanup catalyst arranged in an exhaust pipe of an internal combustion engine; and an HC adsorption catalyst arranged in parallel to and downstream of said cleanup catalyst, during high temperature period said HC adsorption catalyst desorbing and cleaning up HC desorbed during low temperature period, wherein

degradation of said HC adsorption catalyst is diagnosed based on temperature of said HC adsorption catalyst while HC is being desorbed from said HC adsorption catalyst (during HC desorbing period).

2. An internal combustion engine diagnosis apparatus comprising a cleanup catalyst arranged in an exhaust pipe of an internal combustion engine; and an HC adsorption catalyst arranged in parallel to and downstream of said cleanup catalyst, during high temperature period said HC adsorption catalyst desorbing and cleaning up HC desorbed during low temperature period, wherein

degradation of said HC adsorption catalyst is diagnosed based on a gradient of temperature of said HC adsorption catalyst during a period when temperature of said HC adsorption catalyst is within a range of 50°C to 250°C.

3. An internal combustion engine diagnosis apparatus according to any one of claims 1 and 2, wherein said internal combustion engine comprises a temperature detector for detecting temperature of said HC adsorption catalyst,

and degradation of said HC adsorption catalyst is diagnosed based on a detected value of said temperature detector.

4. An internal combustion engine diagnosis apparatus according to any one of claims 1 to 3, wherein a temperature gradient during evaporating of water adsorbed to said HC adsorption catalyst is calculated, and said temperature gradient is compared with a preset diagnosis threshold, and if said temperature gradient is smaller than said diagnosis threshold, it is judged that said HC adsorption catalyst is degraded.

5. An internal combustion engine diagnosis apparatus according to any one of claims 1 to 3, wherein a temperature gradient after evaporating of water adsorbed to said HC adsorption catalyst is calculated, and said temperature gradient is compared with a preset diagnosis threshold, and if said temperature gradient is larger than said diagnosis threshold, it is judged that said HC adsorption catalyst is degraded.

6. An internal combustion engine diagnosis apparatus according to any one of claims 1 to 3, wherein a temperature gradient during evaporating of water adsorbed to said HC adsorption catalyst and a temperature gradient after evaporating of water adsorbed to said HC adsorption catalyst are calculated, and a ratio of said two temperature gradients is compared with a preset diagnosis

threshold, and if said temperature gradient ratio is larger than said diagnosis threshold, it is judged that said HC adsorption catalyst is degraded.

7. An internal combustion engine diagnosis apparatus comprising a cleanup catalyst arranged in an exhaust pipe of an internal combustion engine; and an HC adsorption catalyst arranged in parallel to and downstream of said cleanup catalyst, during high temperature period said HC adsorption catalyst desorbing and cleaning up HC desorbed during low temperature period, wherein

a time period that HC is being desorbed from said HC adsorption catalyst (HC desorbing time period) is measured, and if said HC desorbing time period is larger than a preset diagnosis threshold, it is judged that said HC adsorption catalyst is degraded.

8. An internal combustion engine diagnosis apparatus according to claim 7, wherein said HC desorbing time period is a period from time that temperature of said HC adsorption catalyst exceeds 50°C to time that the temperature reaches 250°C.

9. An internal combustion engine diagnosis apparatus according to claim 8, wherein said internal combustion engine comprises a temperature detector for detecting temperature of said HC adsorption catalyst, and

degradation of said HC adsorption catalyst is diagnosed based on a detected value of said temperature detector.

10. An internal combustion engine diagnosis apparatus according to any one of claims 7 and 8, wherein if said desorbing time period exceeds a preset time, judgment of degradation of said HC adsorption catalyst is prohibited.

11. An internal combustion engine diagnosis apparatus according to any one of claims 7 and 8, wherein if a cumulative value or a maximum value of a flow rate of air flowing into said internal combustion engine during said HC desorbing time period exceeds a preset value, judgment of degradation of said HC adsorption catalyst is prohibited.

12. An internal combustion engine diagnosis apparatus according to any one of claims 6 to 9, wherein said diagnosis threshold is corrected based on a flow rate of air flowing into said internal combustion engine during said HC desorbing time period.

13. An internal combustion engine diagnosis apparatus according to any one of claims 4 to 6, wherein said diagnosis threshold is corrected based on a flow rate of air flowing into said internal combustion engine.

14. An internal combustion engine diagnosis apparatus according to claim 12, wherein when said HC desorbing time period exceeds said diagnosis threshold corrected based on the flow rate of air flowing into said internal combustion engine, it is judged that said cleanup catalyst arranged upstream of said HC adsorption catalyst is degraded.

15. An internal combustion engine diagnosis apparatus according to any one of claims 11 to 14, wherein said internal combustion engine comprises an air flow rate measurement instrument for measuring or estimating a flow rate of air flowing into said internal combustion engine.

10063496-022702

Add
a4